

Academic Program Description Form
2026-2025

Faculty / Institute: College of Science

Scientific Department: Chemistry Department

Academic or Professional Program Name: B.Sc. in Science

Final Certificate Name: B.Sc. in Chemistry Department

Academic System: Semester (Courses)

Description Preparation Data: April – 2026 File Completion Data: 25-1-2025



Signature:

Head of Department Name:

Dr. Azal Shakir Waheeb

Data: 25\1\2026

Signature:

Scientific Association Name:

Dr. Salah Abdul Khuder Hassan

Data: 25\1\2026

The File is Checked by:

Department of Quality Assurance and University Performance

M.Sc. Saleh A. Lazam

Data: 25\1\2026



Approval of the Dean



onor 8X

Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department



Academic Program and Course Description Guide

2025/2026

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic

program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

1. Program Vision

Establishing a pioneering educational environment and supporting the scientific movement with educational outcomes in the field of chemistry that meet market requirements.

2. Program Mission

Provide society with specialized scientific competencies, qualified to compete in the labor market and capable of leadership and innovation
By raising the level of scientific research that meets its needs and contributes to development.

3. Program Objectives

1. Providing universities and colleges with scientifically and technically qualified graduates in all fields of chemistry to continue their higher education and contribute to the national development program and community service.
2. Providing scientific and technical resources to develop faculty members by organizing workshops, discussion groups, and seminars to keep pace with and achieve international quality standards.
3. Preparing scientific, academic, and applied research within research plans to instill a spirit of creative and innovative competition among faculty

and students, and to motivate researchers to publish their scientific research in reputable international scientific journals, thus raising the department's profile within the standards of creative excellence.

4. Contributing to the preparation of well-prepared graduates in various branches of chemistry to enhance the department's outputs for professional work in the public and private sectors.

5. Encouraging students to participate in cultural, scientific, artistic, and social activities, and to implement sustainable development and green education programs.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

5. Other external influences

Is there a sponsor for the program? Ministry of Higher Education and Scientific Research / Al-Muthanna University / College of Science.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Al-Muthanna University Requirements	8	12	12%	
College of Science Requirements	11	27	15-20	
Department Requirements / Chemistry	28	77		

Summer Training	Stage 3			
Other /	Scientific trips	field visits	graduation project	student discussion groups

* This can include notes whether the course is basic or optional.

7.Program Description				
الساعات المعتمدة		Course Code	رمز المقرر أو المساق	Year/Level
practical	Theoretical			
2	3	Kinetic Chemistry	CHE-35027	Third
2	2	Coordination Chemistry 1	CHE-34126	Third
2	2	Organic Chemistry 3	CHE-35128	Third
2	2	Biochemistry 1	CHE-35129	Third
-	2	Fundamentals of Industrial Chemistry	CHE-35130	Third
-	2	English 3	UNI002	Third
-	2	Elective I	-	Third
-	2	Nano chemistry	-	Third
2	3	Electrochemistry	CHE-36033	Third
2	2	Coordination Chemistry 2	CHE-36032	Third
2	2	Organic Chemistry 4	CHE-36034	Third
2	2	Biochemistry 2	CHE-36135	Third
-	2	Quantum Chemistry	CHE-47142	Fourth
3	2	Instrumental Analysis I	CHE-47038	Fourth
2	2	Polymer Chemistry	CHE-47041	Fourth
2	2	Biochemistry III	CHE-47140	Fourth
-	2	Elective II	-	Fourth
-	2	Research Project I	-	Fourth
3	2	Organic Identification	CHE-47139	Fourth
-	2	Molecular	CHE-48046	Fourth

		Spectrochemistry		
3	2	Instrumental Analysis II	CHE-48044	Fourth
2	2	Petrochemicals	CHE-48047	Fourth
-	2	Elective III	-	Fourth
-	2	Research Project II	-	Fourth

8. Expected learning outcomes of the program
Knowledge
<p>Cognitive Objectives</p> <ol style="list-style-type: none"> 1. To provide the student with sufficient information to gain experience in dealing with chemical sciences using laboratory techniques. 2. To provide the student with experience in familiarizing himself with all laboratory equipment and modern techniques. 3. To provide the student with sufficient information to keep pace with and study modern sciences. 4. To acquire a good level of knowledge in the field of chemistry. 5. The student will be able to understand the basic topics in chemistry in the practical field.
Skills
<p>Program Skill Objectives</p> <ol style="list-style-type: none"> 1. To have experience in the knowledge and operation of laboratory testing equipment. 2. To have scientific knowledge to keep pace with recent developments in chemistry. 3. To learn the fundamentals of scientific research through the graduation project. 4. To develop hard and soft skills, including computer skills and English language proficiency.
Ethics
<ol style="list-style-type: none"> 1- Graduating students with a high level of academic proficiency to meet the needs of the country's labor market. 2- Developing undergraduate students' knowledge by equipping them with all the

necessary skills in scientific curricula.

9. Teaching and Learning Strategies

Practical theoretical lectures (direct method), scientific seminars, and laboratory applications. In addition to the training courses offered by the department, the department relies on an integrated educational strategy aimed at developing students' theoretical and practical aspects, and enhancing their critical thinking and scientific research skills, through a combination of interactive and applied methods, as follows: Providing theoretical lectures supported by practical lectures that focus on problem-solving and linking concepts to practical reality. Using interactive lectures and brainstorming to stimulate student participation and develop creative thinking. Implementing regular practical applications in laboratories to train students in the use of scientific tools and techniques. Organizing scientific seminars to present student projects and research and encourage scientific dialogue. Using active learning through group work, case studies, and real-life problem solving. Encouraging students to prepare research projects and field assignments that link theory with practice. Developing scientific presentation and communication skills through classroom and extracurricular activities.

10.Evaluation methods

Through weekly and semester exams, in addition to academic reports.

The department adopts a variety of assessment methods to ensure a comprehensive measurement of students' academic and practical abilities. These include:

Daily Participation and Interaction: The student's engagement with lectures, participation in classroom discussions, and activities is assessed.

Daily Unannounced Quizzes: These are used to measure immediate comprehension of the material and encourage ongoing follow-up.

Monthly Exams: These are held periodically to measure academic progress and identify strengths and weaknesses.

Reports and Seminars: Students are required to prepare academic reports or give presentations (seminars) to measure their ability to research, present, and analyze.

Homework: These are used to enhance understanding outside of class and encourage students to engage in self-study and independently apply concepts.

Final and mid-term exams: They measure the overall level of achievement and are an essential part of the final assessment of the course.

10.Faculty						
Faculty members						
Faculty preparation		Special requirements/skills (if any)		Specialization		Academic rank
Lecturer	Appointed Angel			Private	General	
	#			Physical Chemistry	Chemistry	Prof. Dr. Qasim Mohammed Helou
	#			Organic Chemistry	Chemistry	Prof. Dr. Riyadh Jalil Nahi
	#			Biochemistry	Chemistry	Prof. Dr. Jawad Kadhim Mareh
	#			Physical Chemistry	Chemistry	Prof. Dr. Hassan Subaih Jabr
	#			Physical Chemistry	Chemistry	Prof. Dr. Khawla Kani Jassim
	#			Inorganic Chemistry	Chemistry	Prof. Dr. Azal Shakir Wahib
	#			Biochemistry	Chemistry	Assistant Professor Mona Hassoun Aboudi
	#			Analytical Chemistry	Chemistry	Assistant Professor Zaman Sahib Mahdi
	#			Analytical Chemistry	Chemistry	Assistant Professor Masar Ali Awad
	#			Organic Chemistry	Chemistry	Assistant Professor Shaima Adel Mohammed
	#			Biochemistry	Chemistry	Assistant Professor Shaima Hassan Malah
	#			Industrial Chemistry	Chemistry	Assistant. Wafaa Mahdi Sajit
	#			Inorganic Chemistry	Chemistry	Assistant. Afaf Murtadha Kazim
	#			Organic Chemistry	Chemistry	Assistant. Istabraq Mohsen Yasser

	#			Organic Chemistry	Chemistry	Assistant. Nour Hamid Imran
	#			Physical Chemistry	Chemistry	Assistant. Nahla Ghazi Fahd
	#			Physical Chemistry	Chemistry	Assistant. Duha Majeed Hassan
	#			Organic Chemistry	Chemistry	Assistant. Professor Hawra Abdul Kadhim Mazid
	#			Physical Chemistry	Chemistry	Assistant Ilaf Saleh Hadi

Professional Development

Mentoring new faculty members

Briefly describe the process used to orient new, visiting, full-time, and part-time faculty members at the institutional and departmental levels. Workshops and Training Courses: Courses are organized on modern teaching methods, classroom management, and the use of educational technologies. Participation in Academic Seminars: New faculty members are encouraged to attend conferences and seminars to expand their knowledge and build academic networks.

Evaluation and Feedback: Regularly provide constructive feedback to improve academic performance. Promoting Academic Research and Publication: Supporting new faculty members in preparing and publishing their research and participating in research teams within the department or college. Participation in Committees: New faculty members are provided the opportunity to participate in departmental committees to enhance their understanding of administrative and academic systems.

Professional development of faculty members

Personal development is planned through reviewing modern scientific resources and participating in training courses both inside and outside the country in the field of scientific specialization. The Scientific Department pays special attention to the continuous professional development of faculty members, with the aim of enhancing their teaching and research competencies and keeping pace with academic developments. This includes:

- Organizing advanced workshops and training courses in teaching methods, student assessment, and the use of modern educational technology.

- Encouraging scientific research and academic publishing by supporting participation in conferences, scientific journals, and joint research projects.
- Participating in quality and academic accreditation programs to raise awareness of educational standards and develop institutional performance.
- Academic exchange and cooperation with other universities, both internally and externally, to exchange experiences and expand horizons of knowledge.
- Contributing to the development of curricula and courses to keep pace with scientific developments and labor market needs.
- Self-evaluation and continuous feedback to identify strengths and opportunities for improvement in academic performance.
- Encouraging the use of innovative teaching methods such as active learning and project-based learning.

2. Acceptance Criterion

Central : The program follows the central admission regulations set by the ministry

3. The most important sources of information about the program

- 1- Student Guide for Admission issued by the Ministry of Higher Education and Scientific Research.
- 2- • Student Guide issued by the College of Science, Al-Muthanna University (Quality Assurance Division)
- 3- • Student Guide issued by the Department of Chemistry.

4. Program Development Plan

- 1- The plan aims to improve the quality of teaching and learning and update programs to keep pace with scientific developments and the labor market. This can be achieved through:
- 2- • Periodically reviewing and updating curricula to ensure they are aligned with modern academic standards.
- 3- • Aligning learning outcomes with labor market requirements and focusing on practical aspects through the recommendations of the annual employers' conference.
- 4- • Enhancing practical and applied training within and outside the

college in cooperation with labor market institutions.

- 5- • Introducing modern courses related to sustainable development, such as green chemistry, to support scientific research, critical thinking, and analytical skills.
- 6- • Using modern educational technologies, activating e-learning and interactive courses, and achieving a 20% completion rate for digital courses.
- 7- • Through graduation projects and scientific activities, selecting ideas and projects to solve societal problems.
- 8- • Developing the research and scientific capabilities of faculty members through specialized training workshops.

مخطط مهارات البرنامج

مخرجات التعلم المطلوبة من البرنامج											Course Code	Course Name	Year/Level
القيم		المهارات				المعرفة							
2ق	1ق	4م	3م	2م	1م	5ع	4ع	3ع	2ع	1ع			
#			#		#			#		#	(Basic)	Qualitative Analytical Chemistry	First
#	#	#	#	#		#	#		#		(Basic)	Inorganic Chemistry	First
#			#		#			#		#	(Basic)	Calculus	First
#	#	#	#	#		#	#		#		(Basic)	Chemical Safety and Security	First
#	#	#	#	#		#	#		#		(Basic)	General Physics	First
#			#		#			#		#	(Basic)	Arabic Language	First
#			#		#			#		#	(Basic)	Human Rights	First
#	#	#	#	#		#	#		#		(Basic)	Volumetric Analysis Chemistry	First
#			#		#			#		#	(Basic)	Inorganic Chemistry 2	First
#	#	#	#	#		#	#		#		(Basic)	Statistics	First
#			#		#			#		#	(Basic)	Computer Science 1	First
#	#	#	#	#		#	#		#		(Basic)	Earth Science	First
#			#		#			#		#	(Basic)	Cell Science	First
#	#	#	#	#		#	#		#		(Basic)	English Language 1	First
#	#		#	#		#	#		#		(Basic)	Organic Chemistry 1	First
#			#		#			#		#	(Basic)	Representative Chemistry 1	Second
#			#		#			#		#	(Basic)	Gravimetric Analysis	Second
#	#	#	#	#		#	#		#		(Basic)	Thermodynamics 1	Second
#			#		#			#		#	(Basic)	Differential Equations	Second
#	#	#	#	#		#	#		#		(Basic)	Computer 2	Second
#			#		#			#		#	(Basic)	Organic Chemistry 2	Second

#	#	#	#	#		#	#		#		(Basic)	Representative Chemistry 2	Second	
#	#	#	#	#		#	#		#		(Basic)	Separation Methods	Second	
#			#		#			#		#	(Basic)	Thermodynamics 1	Second	
#	#	#	#	#		#	#		#		(Basic)	English Language 2	Second	
#			#		#			#		#	(Basic)	Computer 3	Second	
#	#	#	#	#		#	#		#		(Basic)	Kinetics	Second	
#	#	#	#	#		#	#		#		(Basic)	Coordination Chemistry 1	Third	
#			#		#			#		#	(Basic)	Organic Chemistry 3	Third	
#			#		#			#		#	(Basic)	Biochemistry 1	Third	
#	#	#	#	#		#	#		#		(Basic)	Fundamentals of Industrial Chemistry	Third	
#			#		#			#		#	(Basic)	English Language 3	Third	
#			#		#			#		#	(Optional)	Chemical Pollution	Third	
#	#	#	#	#		#	#		#		(Basic)	Nanochemistry	Third	
#			#		#			#		#	(Basic)	Electrochemistry	Third	
#	#	#	#	#		#	#		#		(Basic)	Coordination Chemistry 2	Third	
#			#		#			#		#	(Basic)	Industrial Chemistry Applications	Third	
#	#	#	#	#		#	#		#		(Basic)	Research Methodology	Third	
#			#		#			#		#	(Optional)	Surface Chemistry	Third	
#	#	#	#	#		#	#		#		(Basic)	Spectroscopic Instrumental Analysis	Third	
#	#	#	#	#		#	#		#		(Basic)	Metabolic Chemistry	Third	
#			#		#			#		#	(Basic)	Organic Diagnostics 1	Third	
#			#		#			#		#	(Basic)	Quantum Chemistry	Fourth	
#	#	#	#	#		#	#		#		(Basic)	Polymer Chemistry	Fourth	
#			#		#			#		#	(Optional)	Natural Products	Fourth	

#	#	#	#	#	#	#	#	#	#	(Basic)	English Language 4	Fourth	
#			#		#			#	#	(Basic)	Electrochemical Instrumental Analysis	Fourth	
			#		#			#	#	(Basic)	Clinical Chemistry	Fourth	
	#	#	#	#		#	#		#	(Optional)	Pharmaceutical Chemistry	Fourth	
			#		#			#	#	(Basic)	Qualitative Analytical Chemistry	Fourth	
			#		#			#	#	(Basic)	Inorganic Chemistry	Fourth	
	#	#	#	#		#	#		#	(Basic)	Calculus	Fourth	
			#		#			#	#	(Basic)	Chemical Safety and Security	Fourth	
			#		#			#	#	(Basic)	General Physics	Fourth	

- Please tick the boxes corresponding to the individual program learning outcomes under evaluation.

Course Description Form

1. Course Name:	
Coordination chemistry 1	
2. Course Code:	
CHE-34126	
3. Semester / Year: First 2025-2026	
4. Description Preparation Date: 13/9/2025	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Number of study hours (4) / Number of units (3)	
7. Course administrator's name (mention all, if more than one name)	
Name: lecturer Afaf Murtadha Email: afafmurtadha@mu.edu.iq	
8. Course Objectives	
Course Objecti	The aim of this course is to learn about inorganic compound reactions and their mechanisms.
9. Teaching and L	

Strategy	The main start that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	method
Week 1	2 hours	A general introduction to the methods of preparing and reacting coordination complexes	Introduction about mechanism of inorganic complexes reactions	Using Projectors (Smart Screen)	Daily and Monthly Exams

Week 2	2 hours	The stability of complexes	Preparation and reactions of Inorganic complexes	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 3	2 hours	Factors affecting the stability of coordination complexes	Stability of Inorganic complexes	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 4	2 hours	The mechanism of coordination complex reactions	Factors affecting stability of Inorganic complexes Metal effect	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 5	2 hours	Factors affecting reaction rates Substitution reactions in octahedral complexes	Factors affecting stability of Inorganic complexes Ligand effect	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 6	2 hours	Substitution reactions in octahedral complexes	mechanism of Inorganic	Using Projectors (Smart Screen)	Daily and Monthly Exams
	2 hours	Substitution reactions in octahedral complexes	complexes reactions		
Week 7	2 hours	Substitution reactions in square planar complexes	Factors affecting rate of chemical reactions	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 8	2 hours	Redox reactions in coordination complexes	Substitution Reactions of octahedral complexes	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 9	2 hours	Reactions outside the coordination sphere	Substitution Reactions of octahedral complexes	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 10	2 hours	Reactions within the coordination	Substitution Reactions of square planer complexes	Using Projectors (Smart Screen)	Daily and Monthly Exams

		sphere			
Week 11	2 hours	Preparation of coordination complexes using catalytic reactions	Oxidation and Reduction reactions for Inorganic complexes	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 12	2 hours	Deformation in octahedral complexes	Outer Sphere reactions	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 13	2 hours	A general introduction to the methods of preparing and reacting coordination complexes	Inner Sphere reactions	Using Projectors (Smart Screen)	Daily and Monthly Exams

11. Course Evaluation

Quizzes	10%
Exam	25%
Report	5%
Final Exam	%60

12. Learning and teaching resources

Main references (sources)	Transition Metal Chemistry Mahdi Naji Zakoom 1980
Recommended supporting books and references (scientific journals, reports, etc.)	<p>Inorganic chemistry(Huhhey)</p> <p>Shriver and Atkins Inorganic chemistry , 5th ed. , 2010</p> <p>Advanced Inorganic Chemistry.Fourth Edition, John Wiley&Sons,USA . F.Alber</p> <p>Cotton and Geoffrey</p> <p>Synthesis, and characterization of Ni(II), and Cu(II) metal complexes containing new azo dye ligand (N,N,N) and evaluation of their biological activities supported by DFT studies, molecular docking, ADMET profiling, drug-likeness analysis and toxicity prediction</p> <p>Advancement in schiff base complexes for treatment of colon cancer</p> <p>Evaluating the electronic and structural basis of carbon selenide-based quantum</p>

	<p>dots asphotovoltaic design materials: A DFT and MLanalysis</p> <p>Screening thiophene based organic spacersfor their low lying LUMO energies</p> <p>forphotovoltaic dye materials: a Gaussianprocess ML based analysis</p> <p>and Cu(II) metal complexes containing new azo dye ligand (N,N,N) and evaluation</p> <p>DFT studies, molecular docking, ADMET profiling, drug-likeness analysis and</p> <p>treatment of colon cancer</p> <p>basis ofcarbon selenide-based quantum dots asphotovoltaic design materials: A DFT and MLanalysis</p> <p>their low lying LUMO energies forphotovoltaic dye materials: a Gaussianprocess ML based analysis</p> <p>D) metal complexes containing new azo dye ligand (N,N,N) and evaluation of their biological activities</p> <p>by DFT studies, molecular docking, ADMET profiling, drug-likeness analysis and toxicity prediction</p> <p>Advancement in schiff base complexes for treatment of colon cancer</p> <p>basis ofcarbon selenide-based quantum dots asphotovoltaic design materials: A DFT and MLanalysis</p> <p>their low lying LUMO energies forphotovoltaic dye materials: a Gaussianprocess ML based analysis</p> <p>D) metal complexes containing new azo dye ligand (N,N,N) and evaluation of their biological activities</p> <p>by DFT studies, molecular docking, ADMET profiling, drug-likeness analysis and toxicity prediction</p> <p>Advancement in schiff base complexes for treatment of colon cancer</p> <p>basis ofcarbon selenide-based quantum dots asphotovoltaic design materials: A DFT and MLanalysis</p> <p>their low lying LUMO energies forphotovoltaic dye materials: a Gaussianprocess ML based analysis</p>
<p>ctronic references,</p> <p>websites</p>	<p>Electronic references, websites</p>

Course Description Form

1. Course Name:	
Instrumental analysis I	
2. Course Code:	
CHE-47038	
3. Semester / Year: First / 2025-2026	
Semester One/ first	
4. Description Preparation Date: 13/9/2025	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Number of study hours per week, theoretical + practical (5 hours) / number of units (3.5)	
7. Course administrator's name (mention all, if more than one name)	
Name: Assistant Professor Dr. Masar Ali Awad Email: masarali@mu.edu.iq	
8. Course Objectives	
Course Objectives	Introduction to electrochemical analysis methods, definition of the classification of electrochemical analysis methods and the steps of analyzing a chemical model, potentiometric methods, electrodes and their types and working principle, applications of potentiometric methods, electrolytic analysis methods, electro gravimetric analysis, electro gravimetric analysis methods, introduction to coulometric methods and their applications, voltammetry and polarography.
9. Teaching and learning strategies	
Strategy	1- Providing students with experience in applied organic sciences. 2. Providing state institutions with specialized personnel. 3. Preparing highly experienced personnel in the life sciences and knowledgeable in

	<p>high-tech equipment.</p> <p>4. Providing students with scientific techniques for using devices and equipment that can be used in their theoretical and applied studies.</p> <p>5. Researching and studying all new developments in the biological sciences and keeping pace with scientific developments in this field.</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	method
Week 1	2hours	Learn about electrolysis methods and how they work	Introduction to Electrolytic Methods Calculating Potential from the Nernst Equation	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 2	2 hours	Understanding voltage measurements and their calculations	Potential Measurements Applications of Electrode Potential Measurements	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 3	2 hours	Learn about the types of poles and how to use them.	Introduction to Potentiometers –Reference Electrodes (Saturated Calomel Electrode - Silver Ion	Using Projectors (Smart Screen)	Daily and Monthly Exams

			Electrode) –Types of Indicator Electrodes (Type I - Type II - Membrane Indicator Electrodes)		
Week 4	2 hours	Identify membrane electrodes and what they are used for.	Solid-State Electrodes - Liquid-Membrane Electrodes - Gas-Sensitive Electrodes	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 5	2 hours	Learn how to calibrate electrodes and their conditions.	Direct Potentiometer Measurement Methods (Electrode Calibration - Standard Addition)	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 6	2 hours	Learn about the types of jihadist corrections and their calculations	Stress Corrections / Determining the End Point - Equilibrium Corrections - Estimating the Equilibrium Constant by Stress Methods	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 7	2 hours	Learn about voltmetric and amperage methods, which vehicles are used, and what are the conditions for dealing with them.	Volta metric and aerometric corrections	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 8	2 hours	Learn about voltage, current, and concentration calculations	Potential measurements - current /	Using Projectors	Daily and Monthly Exams

		and measurements.	polarized and non-polarized electrodes - their types - the relationship between concentration and ionic intensity	(Smart Screen)	Exams
Week 9	2 hours	Learn about the methods of polarography and the type of cell used, taking into account the use of the dripping mercury electrode and its conditions.	Polarigram / Mercury drip electrode: its features and construction - the relationship between current and the height of the mercury column - Polarigram and its benefits	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 10	2 hours	Learn about the Coffick equation, how to calculate the diffusion current, its relationship to concentration, and the effect of the dripping mercury electrode on the use of the equation.	A study of the effect of radio waves on magnetically active nuclei.	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 11	2 hours	Addressing the polarographic wave, the presence of oxygen, its interference with the wave, and its effect on the propagation current.	Kufic equation	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 12	2 hours	Identify wave distortion, its causes, and treatment methods.	Oxygen wave and its disposal	Using Projectors (Smart	Daily and Monthly Exams

				Screen)	
Week 13	2 hours	Study of applications including qualitative analysis and its relationship to half-wave potential and measuring concentrations of unknown substances	Polarography applications for qualitative as well as quantitative analysis	Using Projectors (Smart Screen)	Daily and Monthly Exams
11. Course Evaluation					
Quizzes	10%				
Exam	25%				
Report	5%				
Final Exam	%60				
12. Learning and teaching resources					
1. Instrumental Analysis / Dr. Abdul Mohsen Al-Haidari 1986 2. Modern Methods and Techniques in Instrumental Chemical Analysis / Jamil Musa Dhabab 2009			Main references (sources)		
1) Gary D. Christian, Analytical Chemistry, fifth edition John Wiley & Sons, 1986. 2) G. W. Ewing, Instrumental methods of Chemical Analysis, Fourth edition, McGraw-Hill, New York, 1975 .			Recommended supporting books and references (scientific journals, reports, etc.)		
Scientific reports and seminars N,N,N) and evaluation of their biological activities supported by DFT studies, ty, and Antibacterial Potential of its Co(III), Ni(II), and Cu(II) Nano Complexes . tion Metal Nanocomplexes of a Novel Azo Derivative Formed from 2-Amino -5- rial: DFT molecular analysis esign materials: A DFT and ML analysis			Recommended supporting books and references (scientific journals, reports, etc.)		
Search the Internet for the latest technologies for vehicle detection.			Electronic references, websites		

Course Description Form

1. Course Name: Nano chemistry	
2. Course Code:	
3. Semester course / Year: First / 2025-2026	
4. Description Preparation Date:13/9/2025	
5. Available Attendance Forms:	
6. Number of Credit Hours (2) / Number of Units (2) 30 hours theoretical	
7. Course administrator's name (mention all, if more than one name)	
Name: Nahla ghazi fahad	
Email: Nahlaghazi@mu.edu.iq	
8. Course Objectives	
Course Objectives	<p>1- The goal of nanochemistry is to educate students about what nanochemistry is and the various In relation to nanotechnology, nano measurement, and other related fields</p> <p>2- the development of nanotechnology from its inception to the present, and educate students about the forms and composition of nanocompounds.</p> <p>3-study the application of nanotechnology</p>
9. Teaching and Learning Strategies	

Strategy	<p>Lectures ,Practical ,Workshops ,Skills and group work</p> <hr/> <p>online quizzes, short answer questions ,a problem class ,Practical labs ,Written reports</p>
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	What is nanotechnology?	Introduction nanotechnology	Cognitive	Quiz , Exams Report exams
2	2	History of nanotechnology	History of nanotechnology	Cognitive + Thinking Cognitive	Quiz , Exams Report exams
3	2	Principles of distinguishing nanotechnology	Recognize of nanotechnology	Cognitive	Quiz , Exams Report exams
4	2	Properties of nanomaterials	Properties of nanomaterials	Cognitive + Problem Solving	Quiz , Exams Report exams
5	2	Chemical Properties of Nanomaterials	Chemical properties of nanomaterials	Cognitive + Thinking + Application	Quiz , Exams Report exams

6	2	Shapes of Nanomaterials	Shapes of nano materials	Cognitive + Thinking	Quiz , Exams Report exams
7	2	Explain Applications of Nanomaterials	Application of nanotechnology	Cognitive	Quiz , Exams Report exams
8	2	Applications of Nanomaterials in Medicine	Application of nanotechnology medicine	Cognitive + Thinking	Quiz , Exams Report exams
9	2	Knowledge Applications of Nanomaterials in Industry	Application of nanotechnology industrial	Cognitive	Quiz , Exams Report exams
10	2	Explain Applications of Nanomaterials in Electronics	Application of nanotechnology electronic	Cognitive + Problem Solv	Quiz , Exams Report exams
11	2	Knowledge Applications of Nanomaterials in the Future	Application of nanotechnology future	Cognitive	Quiz , Exams Report exams
12	2	Proof Methods for Preparing Nanomaterial	Method of preparation nanomaterials	Cognitive + Thinking Cognitive	Quiz , Exams Report exams
13-14-15	2	knowledgeSEM, TEM Technology	TEM, SEM Application of	Cognitive	Quiz , Exams

			SEM ,TEM		Report exams
11.Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
12.Learning and Teaching Resources					
Required textbooks (curricular books, if any)			-		
Main references (sources)			Nano chemistry Fundamentals Book by Muhammad Mazhar 2000		
Recommended books and references (scientific journals, reports...)			Scientific reports and seminars Photocatalytic performance of Soot/TiO2 nanocomposite against toxic dye		
Electronic References, Websites			Search the Internet for some terms and scientific diagrams.		

Course Description Form

1.Course Name: Natural products	
2.Course Code:	
3.Semester course / Year: First / 2025-2026	
4.Description Preparation Date:13/9/2025	
5.Available Attendance Forms:	
6.Number of Credit Hours (2) / Number of Units (2) 30 hours theoretical	
7.Course administrator's name (mention all, if more than one name)	
Name: Asstabraq Mohsin Yasir	
Email: Asstabraq@mu.edu.iq	
8.Course Objectives	
Course Objectives	The chemistry of natural products course aims to clarify what are the types of natural products (primary and secondary metabolites) and the most important natural sources (animal, plant, microorganisms or marine organisms), their classification, methods of extraction, separation and purification from their natural sources, and a description of their chemical composition and methods of synthesis, biological, laboratory and analytical. It also covers the relationship of antibiogram activity to its chemical composition) and what are the most important families of organic chemical compounds representing each type and the difference between them and the rest of the organic compounds
9.Teaching and Learning Strategies	
Strategy	Lectures ,Practical ,Workshops ,Skills and group work

online quizzes, short answer questions ,a problem class ,Practical labs ,Written reports

10.Course Structure

Wee k	Hours	Required Learning Outcomes	Unit or subject name	Learnin g method	Evaluation method
1	2	Cognitive + thinking + application	Introduction ab natural products	Using Projectors (Smart Scre	Quiz , Exams Report exams
2	2	thinking + application	Separation of natu products	Using Projectors (Smart Scre	Quiz , Exams Report exams
3	2	Cognitive + thinking	turbines	Using Projectors (Smart Scre	Quiz , Exams Report exams
4	2	Cognitive + thinking + application	Separation turbines	Using Projectors (Smart Scre	Quiz , Exams Report exams
5	2	Cognitive + thinking + application	Tannians	Using Projectors (Smart Scre	Quiz , Exams Report exams
6	2	Cognitive + application	Separation of tann	Using Projectors (Smart Scre	Quiz , Exams Report

					exams
7	2	Cognitive + thinking	Kumarins	Using Projectors (Smart Scre	Quiz , Exams Report exams
8	2	Cognitive	Alkaloid	Using Projectors (Smart Scre	Quiz , Exams Report exams
9	2	Cognitive + thinking + application	Classification alkaloid	Using Projectors (Smart Scre	Quiz , Exams Report exams
10	2	Cognitive + thinking + application	Volatile oils	Using Projectors (Smart Scre	Quiz , Exams Report exams
11	2	Cognitive + application	Importance of volatile oils	Using Projectors (Smart Scre	Quiz , Exams Report exams
12	2	Cognitive + thinking +	vitamins	Using Projectors (Smart Scre	Quiz , Exams Report exams
13	2	Cognitive + thinking + application	Importance vitamins	Using Projectors (Smart Scre	Quiz , Exams Report exams

11. Course Evaluation		
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc		
12. Learning and Teaching Resources		
Required textbooks (curricular books, if any)		
Main references (sources)	The Book of Medicinal Plants and Their Therapeutic Uses (Dr. Wael Mohamed Al-Aghwani) 2024	
Recommended books and references (scientific journals, reports...)	Design, Synthesis and Molecular Docking Study of New 1,2,3-Triazole Derivatives for Potential Anti-Breast Cancer Activity 2-Synthesis of new heterocyclic 1,4-bis(2-phenyl-2,3-dihydrobenzo-1,3-oxazepine-4,7-dione)benzene	
Electronic References, Websites		

Course Description Form

1. Course Name:	
Pharmaceutical Chemistry	
2. Course Code:	
3. Semester / Year: First / 2025-2026	
4. Description Preparation Date: 13/9/2026	
5. Available Attendance Forms:	
6. Number of Credit Hours (Total) / Number of Units (Total)	
Number of study hours (2) per week / Number of units (2)	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr Shaymaa Adil Mohammed Email: shiemaa@mu.edu.iq	
8. Course Objectives	
Course Objectives	<ul style="list-style-type: none"> ● Explain the basic concepts of Pharmaceutical ● summaries the relationship between chemical structure for drugs.
9. Teaching and L	
Strategy	<p>.</p> <ul style="list-style-type: none"> ● Providing students with experience in applied life sciences. ● Providing state institutions with specialized personnel. ● Preparing highly experienced personnel in the life sciences and knowledgeable in high-tech equipment.

- Providing students with scientific techniques for using devices and equipment that can be used in their theoretical and applied studies.
- Researching and studying all new developments in the biological sciences and keeping pace with scientific developments in this field.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	method
Week 1	2 Hours	Cognitive	Basic concept of prodrugs	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 2	2 Hours	Cognitive + Thinking	mechanism for the conversion of prodrug to an active drug	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 3	2 Hours	Cognitive	Types of prodrugs	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 4	2 Hours	Cognitive + Problem Solving	Chemical classification of carrier linked prodrug	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 5	2 Hours	Cognitive + Thinking + Application	double(mutual) prodrug	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 6	2 Hours	Cognitive + Thinking	Example (double ester) prodrug	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 7	2 Hours	Cognitive	Types of prodrugs: Based on Chemical linkage	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 8	2	Cognitive + Thinking	Prodrugs for Amines	Using Projectors	Daily and Monthly Exams

	Hours			(Smart Screen)	
Week 9	2 Hours	Cognitive	Rational For the Use of Prodrugs	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 10	2 Hours	Cognitive + Problem Solving	Alteration of Drug Solubility	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 11	2 Hours	Cognitive + Thinking	Chemical Drug Delivery Systems: Strategies and Applications	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 12	2 Hours	Cognitive + Thinking + Application	Drug Targeting	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 13	2 Hours	Cognitive + Thinking	Targeted prodrug design	Using Projectors (Smart Screen)	Daily and Monthly Exams

11. Course Evaluation

Quizzes	20%
Exam	40%
Final Exam	%60

12. Learning and teaching resources

Wilson and Gisvold Textbook of Organic and Medicinal 2015

Pharmaceutical Chemistry; Delgado JN, Remers WA, (Eds.); 12th ed., 2011

Synthesis and characterization of ionic liquids by imidazolium salts derivatives and study
Molecular docking of compounds

COMPUTATIONAL DETAILS OF MOLECULAR STRUCTURE, SPECTROSCOPIC PROPERTIES, DFT CALCULATIONS AND MOLECULAR DOCKING STUDY OF SOME 1,4-

<p>DISUBSTITUTED-1,2,3-TRIAZOLE DERIVATIVES DERIVED FROM 4- AMINOBENZEN SULFONIC ACID</p> <p>Kinetic Study of Adsorption of Murexide Dye Polluting the Aquatic Environment Using one of the Industrial Wastes, Antimony Trioxide, and its Applicability to Freundlich Isotherm</p> <p>New macrocycles incorporating glycolipids via copper catalyzed triazole coupling</p>	

Course Description Form

1.Course Name:	
Organic Identification 1	
2.Course Code:	
CHE-47139	
3.Semester / Year: First / 2025-2026	
4.Description Preparation Date: 13/9/2025	
5.Available Attendance Forms:	
6.Number of Credit Hours (Total) / Number of Units (Total)	
Number of hours (5) in the week / Number of units (3.5)	
7.Course administrator's name (mention all, if more than one name)	
Name: Riyadh Jalel Nahi Email: Riyadh@mu.edu.iq	
8.Course Objectives	
Course Objectives	<ul style="list-style-type: none"> ● Explain the basic concepts of Organic identification ● summaries the relationship between chemical structure for compounds
9. Teaching and learning strategies	
Strategy	<ol style="list-style-type: none"> 1- Providing students with experience in applied organic sciences. 2. Providing state institutions with specialized personnel. 3. Preparing highly experienced personnel in the life sciences and knowledgeable in high-tech equipment. 4. Providing students with scientific techniques for using devices and equipment that

	<p>can be used in their theoretical and applied studies.</p> <p>5. Researching and studying all new developments in the biological sciences and keeping pace with scientific developments in this field.</p>
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10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	method
Week 1	2	Cognitive	Introduction to energy, solar spectrum, and ultraviolet spectra	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 2	2	Cognitive + Thinking Cognitive	Theoretical wavelength calculations	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 3	2	Cognitive	Identification of chromophore and auxochrome groups	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 4	2	Cognitive + Problem Solving	Absorption of the benzene ring and the effect of double bonds on absorption values	Using Projectors (Smart Screen)	Daily and Monthly Exams

Week 5	2	Cognitive + Thinking + Application	General introduction to the infrared spectrum	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 6	2	Cognitive + Thinking	Study of the types of vibrations resulting from exposure of organic groups to the infrared spectrum	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 7	2	Cognitive	Identification of the ranges of organic groups in the infrared spectrum, giving examples for each functional group: C-H, O-H, N-H, S-H, C-X, C-C, C-N, C=, C=C	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 8	2	Cognitive + Thinking	Study the factors affecting the absorption bands of the infrared spectrum.	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 9	2	Cognitive	A general introduction to nuclear magnetic resonance spectroscopy.	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 10	2	Cognitive + Problem Solving	A study of the effect of radio waves on magnetically active nuclei.	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 11	2	Cognitive + Thinking	Understand the ranges of the nuclear magnetic resonance spectra of active organic compounds.	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 12	2	Cognitive + Thinking	A general introduction to mass spectrometry.	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 13	2	Cognitive + Problem Solving	A study of fragmentation, knowledge of isotopes of important elements, and	Using Projectors (Smart Screen)	Daily and Monthly Exams

			how organic compounds break down.		
11.Course Evaluation					
Quizzes		10%			
Exam		25%			
Report		5%			
Final Exam		%60			
12.Learning and teaching resources					
Organic Spectroscopy William Kemp 2005 Organic Structures from Spectra Fourth Edition 2008 Organic Chemistry Morrison Sixth Edition 2001			Main references (sources)		
Identification systematic for organic compounds George Jonathan Sarkis.			Recommended supporting books and references (scientific journals, reports, etc.)		
Scientific reports and seminars			Identification systematic for organic compounds George Jonathan Sarkis Synthesis and Molecular Docking Studies of New Pyrimidinone ring Containing 1,2,3-Triazole Derivatives Combination and Molecular Docking Studies of 1,2,3-Triazole and Pyrimidin-2-thione Rings for Potential Anti-COVID-19 Activity COMPUTATIONAL DETAILS OF MOLECULAR STRUCTURE, SPECTROSCOPIC PROPERTIES, DFT CALCULATIONS AND MOLECULAR DOCKING STUDY OF SOME 1,4-DISUBSTITUTED-1,2,3-TRIAZOLE DERIVATIVES DERIVED FROM 4-AMINOBENZENESULFONIC ACID		
Search the Internet for the latest technologies for vehicle detection.			Electronic references, websites		

Course Description Form

1.Course Name:	
Petrochemical Chemistry	
2.Course Code:	
CHE-48046	
3.Semester / Year: First / 2025-2026	
4.Description Preparation Date:13/9/2025	
5.Available Attendance Forms:	
6.Number of Credit Hours (Total) / Number of Units (Total)	
Number of hours (4) in the week / Number of units (3)	
7.Course administrator's name (mention all, if more than one name)	
Name: Ms. Wafaa Mahdi Sajit	
Email: wafamahdi@mu.edu.iq	
8.Course Objectives	
Course Objectives	<ul style="list-style-type: none"> ● Study and knowledge of petrochemical industries, properties and types of crude oil
9. Teaching and learning strategies	
Strategy	<ol style="list-style-type: none"> 1- Providing students with experience in applied organic sciences. 2. Providing state institutions with specialized personnel. 3. Preparing highly experienced personnel in the life sciences and knowledgeable in high-tech equipment. 4. Providing students with scientific techniques for using devices and equipment that can be used in their theoretical and applied studies. 5. Researching and studying all new developments in the biological sciences and

	keeping pace with scientific developments in this field.
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10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	method
Week 1		Cognitive	General Introduction / Definition of Petrochemicals	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 2		Cognitive + Thinking Cognitive	Petroleum and its Primary Derivatives in the Petrochemical Industry	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 3		Cognitive	Production of Synthetic Gas and its Derivatives	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 4		Cognitive + Problem Solving	Pyrolysis and Catalytic Pyrolysis Processes for the Production of Basic Raw Materials for the Petrochemical Industry	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 5		Cognitive + Thinking + Application	Pyrolysis of Acetylene, Pyrolysis for the Formation of Butane, and Others	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 6		Cognitive + Thinking	Oxidation Processes and Their Applications in the Petrochemical Industry	Using Projectors (Smart Screen)	Daily and Monthly Exams

Week 7		Cognitive	Halogenation Processes and Their Applications / Dye Industry	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 8		Cognitive + Thinking	Halogenation Processes and Their Applications / Polymer Industries.	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 9		Cognitive	Alkylation Processes and Their Applications / Detergent Industry	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 10		Cognitive + Problem Solving	Alkylation Processes and Their Applications / Refined Fuel Industry	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 11		Cognitive + Thinking	Processes for the Formation of Aromatic Derivatives and Their Importance in the Petrochemical Industry	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 12		Cognitive + Thinking	Production of Fertilizers, Urea, and Ammonia .	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 13		Cognitive + Problem Solving	Various Petrochemical Processes with Industrial Uses	Using Projectors (Smart Screen)	Daily and Monthly Exams

11.Course Evaluation

Quizzes	10%
Exam	25%
Report	5%
Final Exam	%60

12.Learning and teaching resources

Fundamentals of Industrial Chemistry", Edition, Part One, University of Basra, 1986.	Main references (sources)
Foundations of industrial chemistry	Recommended supporting books and references (scientific journals, reports, etc.)

<p>Scientific reports and seminars</p> <p>Retrospective Study on the Therapeutic Effects and Nutritional Values of Camel's Milk https://www.researchgate.net/publication/326984751_Retrospective_Study_on_the_Therapeutic_Effects_and_Nutritional_Values_of_Camels_Milk 3. Synthesis of Nanocomposite Based on Poly Methylene-imidazole as Effective Catalyst in Oxidation of Some Hydrocarbones https://www.researchgate.net/publication/329889319_Synthesis_of_nanocomposite_based_on_poly_methyleneimidazole_as_effective_catalyst_in_oxidation_of_some_hydrocarbones 4. Cobalt (II) and Nickel (II) Complexes with Schiff Base Ligand Derived From 4-Amino Antipyrine: Synthesis, Spectral, Characterization and Thermal Studies https://www.researchgate.net/publication/329889144_Cobalt_II_and_Nickel_II_complexes_with_schiff_base_ligand_derived_from_4-amino_antipyrine_Synthesis_spectral_characterization_and_thermal_studies 5. Physicochemical properties of Iraq dromedary camels milk https://www.researchgate.net/publication/322644634_PHYSICOCHEMICAL_PROPERTIES_OF_IRAQ_DROMEDARY_CAMELS_MILK</p>	<p>Recommended supporting books and references (scientific journals, reports, etc.)</p>
<p>Search the Internet for the latest technologies vehicle detection.</p>	<p>Electronic references, websites</p>

Course Description Form

1.Course Name:	
Industrial chemistry	
2.Course Code:	
CHE-36036	
3.Semester / Year: First /2025-2026	
Semester One/ first	
4.Description Preparation Date:13/9/2026	
5.Available Attendance Forms:	
6.Number of Credit Hours (Total) / Number of Units (Total)	
Number of study hours per week, (2 hours) / number of units (2)	
7.Course administrator's name (mention all, if more than one name)	
Name: Ms. Wafaa Mahdi Sajit wafamahdi@mu.edu.iq	
8.Course Objectives	
Course Objectiv	To know industrial methods, their interactions and applications, and to kn industrial risks..
9.. Teaching and learning strategies	
Strategy	<ol style="list-style-type: none"> 1- Providing students with experience in applied organic sciences. 2. Providing state institutions with specialized personnel. 3. Preparing highly experienced personnel in the life sciences and knowledgeable in high-tech equipment. 4. Providing students with scientific techniques for using devices and equipment that can be used in their theoretical and applied studies. 5. Researching and studying all new developments in the biological sciences and

	keeping pace with scientific developments in this field.
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10.Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	method
Week 1		Cognitive + Problem Solving	General Introduction	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 2		Cognitive + Thinking + Application	History of Industrial Chemistry – Classification of Chemical Industries	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 3		Cognitive + Thinking	Basic Concepts – Transformation – Yield – Productivity – Efficiency	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 4		Cognitive + Problem Solving	Economics – Factors Affecting Capital – Production Chemical Manufacturing Processes:	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 5		Cognitive + Thinking + Application	Types of Processes – Reactors Used	Using Projectors (Smart Screen)	Daily and Monthly Exams

Week 6		Cognitive + Thinking	Catalytic Processes and Their Reactors – Flow Curves – Chemical	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 7		Cognitive	Catalytic Processes and Their Reactors – Flow Curves – Chemical Processes – Material Balance in Chemical Manufacturing Reactors	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 8		Cognitive + Thinking	Physical Processes in the Chemical Industry – (Fracture – Cutting – Crushing – Dissolution – Sublimation)	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 9		Cognitive + Problem Solving	Fuels Used in Industrial Processes: Gaseous Fuels – Solid Fuels	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 10		Cognitive + Thinking + Application	Solar energy - nuclear energy - other sources.	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 11		Cognitive + Problem Solving	A simplified understanding of matter transfer and energy transfer.	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 12		Cognitive + Thinking + Application	Factors contributing to the chemical industry.	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 13		Cognitive + Thinking	Water treatment for industrial purposes: Water sources - water quality. Water treatment methods - quality control tests. Corrosion - its causes and treatment.	Using Projectors (Smart Screen)	Daily and Monthly Exams
11.Course Evaluation					
Quizzes		10%			
Exam		25%			

Report	5%
Final Exam	%60
12.Learning and teaching resources	
Industrial Chemistry Dr. Korkis Abdul Adam1980	Main references (sources)
<p>Fundamentals of Industrial Chemistry, Dr. Aziz Ahmed Amin</p> <p>2-Industrial Chemistry. Chemical Industry Technology, Dr. Tariq Ismail Kakhia .</p>	<p>Recommended supporting books and references (scientific journals, reports, etc.)</p> <p>Retrospective Study on the Therapeutic Effects and Nutritional Values of Camel's Milk^[1] https://www.researchgate.net/publication/326984751_Retrospective_Study_on_the_Therapeutic_Effects_and_Nutritional_Values_of_Camels_Milk 3. Synthesis of Nanocomposite Based on Poly Methylene-imidazole as Effective Catalyst in Oxidation of Some Hydrocarbones https://www.researchgate.net/publication/329889319_Synthesis_of_nanocomposite_based_on_poly_methylene_imidazole_as_effective_catalyst_in_oxidation_of_some_hydrocarbones 4. Cobalt (II) and Nickel (II) Complexes with Schiff Base Ligand Derived From 4-Amino Antipyrine: Synthesis, Spectral, Characterization and Thermal Studies https://www.researchgate.net/publication/329889144_Cobalt_II_and_Nickel_II_complexes_with_schiff_base_ligand_derived_from_4-amino_antipyrine_Synthesis_spectral_characterization_and_thermal_studies 5. Physicochemical properties of Iraq dromedary camels' milk https://www.researchgate.net/publication/322644634_PHYSICOCHEMICAL_PROPERTIES_OF_IRAQI_DROMEDARY_CAMEL'S_MILK</p>
Scientific reports and seminars	Recommended supporting books and references (scientific journals, reports, etc.)
Search the Internet for the latest technologies vehicle detection.	Electronic references, websites

Course Description Form

1.Course Name:					
Clinical Chemistry					
2.Course Code:					
CHE-47140					
3.Semester / Year: First /2025-2026					
Semester One/ first					
4.Description Preparation Date: 113/9/2026					
5.Available Attendance Forms:					
6.Number of Credit Hours (Total) / Number of Units (Total)					
Number of hours (4) in the week / Number of units (3)					
7.Course administrator's name (mention all, if more than one name)					
Name: Muna Hasson					
Email: Muna.hasson@mu.edu.iq					
8.Course Objectives					
Course Objectives		<ul style="list-style-type: none"> ● Explain the basic concepts of Biochemistry ● summaries the relationship between chemical structure for compounds 			
9.Teaching and L					
Strategy		The main start that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their Biochemistry thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.			
10.Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	method

Week 1		Cognitive	Introduction of metabolism, glycolysis	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 2		Cognitive + Thinking	Fate of pyruvate under aerobic and anaerobic condition, Gluconeogenesis	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 3		Cognitive	Pentose phosphate pathway, regulation of glycolysis and gluconeogenesis	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 4		Cognitive + Problem Solving	Glycogen synthesis and breakdown, regulation of glycogen metabolism	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 5		Cognitive + Thinking + Application	Citric acid cycle, regulation of TCA	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 6		Cognitive + Thinking	Oxidation of fatty acids	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 7		Cognitive	Ketone bodies, Fatty	Using Projectors (Smart Screen)	Daily and Monthly Exams
		Cognitive + Thinking	acids biosynthesis	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 8		Cognitive	Biosynthesis of triacylglycerols and cholesterol	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 9		Cognitive + Problem Solving	Proteins metabolism-oxidation of amino acid,	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 10		Cognitive + Thinking	Urea cycle, pathways of amino acid degradation	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 11		Cognitive + Thinking	Degradation of amino	Using Projectors	Daily and

		+ Application	acids to pyruvate	(Smart Screen)	Monthly Exams
Week 12		Cognitive + Thinking	Convert of amino acids to glucose or to ketone bodies, Biosynthesis of amino acids	Using Projectors (Smart Screen)	Daily and Monthly Exams
Week 13		Cognitive + Thinking + Application	Preparatory week before the final Exam	Using Projectors (Smart Screen)	Daily and Monthly Exams

11.Course Evaluation

Quizzes	10%
Exam	25%
Report	5%
Final Exam	%60

12.Learning and teaching resources

LIPPINCOTT BIOCHEMISRY ED 3 2003	Main references (sources)
Principles of biochemistry-Lehninger 1990 Principles of biochemistry, 7th edition, Smith et al., McGraw- Hill	Recommended supporting books and references (scientific journals, reports, etc.)
Hydroxylamine-O-Sulfonic Solid Acid as an Efficient Anti-Hemolytic Catalyst Clinical Characteristics of Acute Kidney Injury in Acute Gastroente Patients: A Prospective Analysis	Recommended supporting books and references (scientific journals, reports, etc.)
Search the Internet for the latest technologies vehicle detection.	Electronic references, websites

